

NAVAL WAR COLLEGE
Newport, Rhode Island

It's Operational Art: Employing Submarines in Third World Conflicts

by

John F. Loye, III
Captain, USN


A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 

18 May 1998

Paper directed by
Captain G. W. Jackson, USN
Chairman, Joint Military Operations Department


Captain C. E. Helms, USN
Faculty Advisor

15 May 98
Date

DTIC QUALITY INSPECTED 1

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority: NA			
3. Declassification/Downgrading Schedule: NA			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: Approved for Public Release: Distribution is			
5. Name of Performing Organization:		Unlimited	
JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): IT'S OPERATIONAL ART: EMPLOYING SUBMARINES IN THIRD WORLD CONFLICTS (U)			
9. Personal Authors: CAPT JOHN LOYE, USN			
10. Type of Report: FINAL		11. Date of Report: 18 MAY 1998	
12. Page Count: 23			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: SUBMARINE, SOF, DIESEL, OPERATIONAL INTEL, STRIKE, LITTORAL, THIRD WORLD, TIME SENSITIVE, CINCS, PROVOCATIVE			
<p>15. Abstract: Operational commanders have seldom employed submarines in wartime as their prewar plans originally envisioned. In the aftermath of the cold war, third world conflicts involving the United States, either unilaterally or as part of coalition forces, appear more likely. Limitations aside, submarines can be a valuable component of military forces used in such conflicts if properly integrated into the operational plans. Now is the time for commanders to consider the operational factors, functions, and principles—the operational art—that must be implemented to effectively employ submarines before and during a third world conflict.</p> <p>This paper examines how submarines can be part of the "artistic color palette" used by commanders confronted with a third world crisis. Submarines will never be a panacea in solving a commander's wartime requirements, but often they will be part of the solution.</p> <p>Objective evaluation and decision making processes are impossible unless operational commanders are aware of the potential ramifications their decisions have on a submarine's contributions to joint forces. My thesis is that a commander's decision, or lack of decision, often weeks before commencement of an operation, will determine the effectiveness of the submarines under his operational control. I argue that time sensitive submarine employment decisions are frequently made too late. The paper's conclusion contains operational level findings and recommendations to enhance U.S. and allied submarine contributions in future third world conflicts.</p>			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

TABLE OF CONTENTS

Introduction.....	1
A Historical Perspective and Lessons Learned.....	2
World War I.....	3
World War II.....	4
The Modern Era.....	4
Can SSNs Be Used in Future Third World Conflicts?.....	5
Submarine Capabilities.....	5
Submarine Limitations.....	6
A Provocative versus Non Provocative Presence.....	6
Submarine Gunboat Diplomacy.....	7
Submarine Employment Guidance.....	8
Preparing and Shaping the Battlespace for a Third World Conflict.....	8
Think Ahead: Submarines—First In and First Out.....	8
Submarine Operational Intelligence: Do it Early.....	9
The Diesel Submarine Threat Can Alter the Plans.....	10
The Silver Bullet: Submarine Special Operations Forces.....	12
When Surprise Matters: Submarine Strike.....	14
Conclusion.....	15
Recommendations.....	15

IT'S OPERATIONAL ART: EMPLOYING SUBMARINES IN THIRD WORLD CONFLICTS

Introduction

In the aftermath of the Cold War, third world conflicts involving the United States, either unilaterally or as part of coalition forces, appear more likely. Limitations aside, submarines can be a valuable component of military forces used in such conflicts if properly integrated into the operational plans. Now is the time for commanders to consider the operational factors, functions, and principles—the operational art—that must be implemented to effectively employ submarines before and during a third world conflict.

Today the nuclear powered fast attack submarine (SSN) is a multi-mission, versatile warship that is more survivable than any other combatant in history.¹ Compare this with surface combatants which with the advent of new technologies are more vulnerable to attack than ever before, especially when operating in littoral waters near a potential adversary.² A study by the Naval Research Advisory Committee highlighted the greatest weakness in the Navy's littoral warfare strategy as being the lack of defense against antiship cruise missiles.³ To help overcome the operational limitations imposed by this dilemma (particularly in small, limited third world conflicts when an adversary's lucky shots matter), theater commanders (CINCs) and joint task force commanders (CJTFs) should contemplate how and under what circumstances they should be employing a SSN. In today's rapidly changing environment, operational commanders ought to resolve now what SSNs can contribute to joint forces involved in tomorrow's third world conflicts.

This paper examines how submarines can be part of the "artistic color palette" used by commanders confronted with a third world crisis. Submarines will never be a panacea in solving a commander's wartime requirements, but often they will be part of the solution. A brief historical analysis, from an operational commander's perspective, was conducted because tomorrow's success is inextricably linked to the past. To help an operational commander's decision making process, potential submarine contributions in solving a third world conflict and appropriate instances to employ a SSN are included.

Objective evaluation and decision making processes are impossible unless operational commanders are

¹ Merrick Carey and Loren Thompson, "Submarines and the Future of Seapower," Strategic Review, Fall 1996, 17.

² Ibid.

³ William C. Pritchett, "SSNs Have Role in Low Intensity Conflicts," US Naval Institute Proceedings, July 1996, 71.

19980825 098

aware of the potential ramifications their decisions have on a submarine's contributions to joint forces. My thesis is that a commander's decision or lack of decision, often weeks before commencement of an operation, will determine the effectiveness of the submarines under his operational control (OPCON). I argue that time sensitive submarine employment decisions are frequently made too late. The paper's conclusion contains operational level recommendations to enhance U.S. and Allied submarine contributions in future third world conflicts.

A Historical Perspective: Submarine Operational Warfare—It's Always Changing

To His Excellency, Abraham Lincoln, President of the United States

I wish to propose to you a new arm of war, as formidable as it is economical. With a submarine boat, well constructed and properly equipped, it becomes an easy matter to:

- * Carry explosive bombs under the very keels of vessels
- * Land men, ammunition etc. at any given point
- * Enter harbors
- * Reconnaissance the enemy's coast

I have the honor to be with distinguished consideration. Your Excellency's most obedient servant.

De Villeroy, 4 September 1861⁴

Submarines have been a part of American naval heritage since David Bushnell's Turtle attempted to sink the British ship H.M.S. Eagle in New York Harbor during the American War for Independence. Almost 85 years later, the Confederate States were the first to successfully employ a new underwater weapon called the "torpedo boat". On February 17, 1864, the Confederate torpedo boat C.S.S. H.L. Hunley sank the first man-of-war in combat when the U.S.S. Housatonic went to the bottom just outside Charleston Harbor, South Carolina. A submarine had drawn blood in combat. After her successful actions, the Hunley and her crew of nine were not heard from again but they had begun a new chapter in naval warfare.⁵ Since then, submarine operational art, or the link to ensure the proper integration of submarines into an effective war winning campaign aimed at attaining strategic and operational objectives,⁶ has continuously undergone transition. Moreover, operational commanders have seldom used submarines in combat as their prewar plans originally envisioned.

The operational art of submarine warfare has evolved since the commissioning of the first U.S. Navy submarine, U.S.S. Holland in 1900. Prior to World War I, three distinct roles developed for submarines:

⁴ Kevin Peppe, "Rethinking Tomorrow's Attack Submarine Force," The Submarine Review, June 1995, 53.

⁵ Mark K. Raglan, The Hunley: Submarines, Sacrifice, and Success in the Civil War (Miami/Charleston: Narwhal Press, 1995), 11.

⁶ U.S. Joint Chiefs of Staff, Doctrine for Joint Operations (Joint Pub 3-0) (Washington, D.C.:February 1, 1995), II-2.

coastal defense, attrition of surface combatants, and attacks on commercial shipping.⁷ The unrestricted submarine warfare campaign used by the German navy during that war demonstrated the impact underwater warships could have on theater and national security strategies. But, throughout the war, the Germans were hesitant to fully embrace an unrestricted submarine warfare strategy, including the practice of not warning the intended target, because of the possible repercussions.⁸ They were proven correct when Germany's eventual decision to invoke this strategy brought the United States into the war. Despite the intrinsic complexities of antisubmarine warfare and the huge toll on merchant shipping that German submarines inflicted on Great Britain's war efforts, British operational commanders never fully appreciated what a carefully orchestrated submarine campaign could achieve. However, the Allies did develop enough fear of the U-boats to specifically ban postwar Germany from having any. Tragically, from the Allies' perspective, many of the lessons of World War I, particularly the convoy system and coordinated submarine detection methods, required relearning again in World War II. Operational commanders had not clearly understood and implemented the lessons from the last war.

During the inter-war years, the U.S. Navy formulated a maritime strategy centered around the dominance of sea based air forces and large surface combatants. The United States devoted its submarine development and doctrine to the creation of long range "fleet" submarines designed to support the blue water battle fleet.⁹ Consequently, on the eve of World War II, the Navy's plans advocated submarines for only simple coastal defense purposes and for direct support of fleet operations.¹⁰ American operational commanders did not embrace using submarines to attack commercial shipping because they considered targeting civilian ships an illegal act. Unlike the Americans, Germany again initiated an unrestricted submarine warfare strategy when a U-boat sank the ocean liner *Athena* in 1939. The Battle of the Atlantic had started. Later, Winston Churchill stated "the only thing that truly worried me was the U-boat menace."

The surprise attack on Pearl Harbor instantly nullified the United States' prewar submarine plans. Shortly afterwards, recognizing that the only immediate way to strike Japan was through a well organized submarine warfare campaign, President Roosevelt authorized a national military strategy aimed at the economic collapse of

⁷ Carey and Thompson, 18.

⁸ Tom Clancy, *Submarine: A Guided Tour Inside a Nuclear Warship* (New York: Berkley Books 1993), 5.

⁹ Ibid.

¹⁰ Carey and Thompson, 19.

Japan by using Pacific based submarines whose task was to sink all Japanese shipping—commercial and military.¹¹ Unfortunately, because of a lack of prewar operational planning, submarine force tactical deficiencies, and torpedo technical problems, the campaign commenced slowly. But by war's end, the Pacific fleet's silent service had sunk about a third of Japan's warships and over 50% of its merchant shipping.¹² Operational commanders relied on submarines to bring the war to Japan—from beginning to end.

After World War II, with the advent of nuclear power and the beginning of the Cold War, submarine warfare again entered a period of transition. Submarines became the best defense against other submarines and were assigned new antisubmarine warfare roles.¹³ This role remained the submarine force's top priority for nearly 30 years. Following the end of the Cold War, enough SSNs became available to permit integral submarine support for deployed carrier battle groups. Similarly, CINCs and CJTFs were given additional flexibility to directly order submarine tasking in support of theater objectives. Finally, from the Navy's perspective, the submarine force was becoming a team player. But naval and theater commanders were unsure how to employ SSNs in a new, nontraditional and changing operational environment.

The national strategic and theater operational impact of clandestine submarine operations in the modern-day era was best demonstrated by three British SSNs during the Falklands Islands War. The British government ordered three nuclear powered submarines (H.M.S. *Splendid*, H.M.S. *Conqueror*, and H.M.S. *Spartan*) to the Falklands Islands area of operations (AO) on March 29, 1982. Subsequently, on April 12, Prime Minister Thatcher's government declared a British imposed Maritime Exclusion Zone (MEZ) in the vicinity of the islands as *Spartan* arrived on station near Port Stanley.

Conqueror enforced the MEZ by locating and shadowing Argentine Navy units which included the cruiser *General Belgrano*, the aircraft carrier *Veinticinco De Mayo*, and two German produced Type 209 submarines. *Spartan* and *Splendid* loitered just outside Argentine territorial waters in the vicinity of air bases to provide early Intelligence and Warning (I&W) on enemy aircraft sorties toward the Falklands.¹⁴ As noted by one Royal Navy officer, at this point the Argentine Navy was unable to confirm, deny, or deal with the possibility of SSNs operating

¹¹ Ibid., 20.

¹² Clancey, 9.

¹³ "Submarine Roles in the Future," The Submarine Review, January 1992, 5.

¹⁴ Clancey, xx.

near its forces, in waters that were considered unsafe for British surface ships.¹⁵ Because of this uncertainty, the outcome of the war was decided. The British SSNs denied the Argentine Navy unencumbered access to the AO. The sinking of *General Belgrano* by *Conqueror* confirmed the submarine's presence and instantly changed the Argentine war fighting strategy. In essence, the sinking of the cruiser was so devastating that it was sufficient to deny the Argentine Navy the use of the sea, resulting in Royal Navy sea supremacy for the war's duration.¹⁶ One SSN had changed the war's strategic and operational environment.

More recently, during the joint air strike in April 1986 against Colonel Qaddafi's regime, SSNs were an important reason the Libyan's six Soviet built diesel submarines remained in port during the pre-strike and post-strike positioning of Sixth Fleet units.¹⁷ The lesson learned from these examples is that even though a SSN cannot accomplish every traditional naval mission, it is versatile enough to deny an enemy "the ability to execute any mission at sea"¹⁸ while simultaneously influencing strategic and operational events ashore. These lessons apply equally well today.

Can SSNs be Used in Future Third World Conflicts?

"I heard the voice of the Lord, saying, 'Whom shall I send, and who will go for us?' Then said I 'Here am I; send me.' " Isaiah 6:8

Theater CINCs and CJTFs are responsible for determining forces needed to respond to conceivable third world threats. Although a SSN will seldom, if ever, be the total solution to an operational commander's problem, often a submarine should be part of the tools at his disposal. When sea denial, deterrence, and forward presence matter, a SSN provides commanders with a unique joint asset that can act as a sea control resource and as a force enabler for naval, air, and ground operations.¹⁹

From a CINC's perspective, submarines possess several limitations that must be considered during the operational design process. A SSN's most severe constraint is its inability to maintain continuous two way communications when submerged. Until this problem is resolved, SSNs remain unable to be full time participants in the information and engagement grids used to rapidly generate battlespace awareness and to synchronize

¹⁵ Ibid.

¹⁶ "Submarine Roles in the Future," 11.

¹⁷ Don M. Snider, "Attack Submarines in the Post-Cold War Era: The Issues Facing Policymakers," The Submarine Review, June 1994, 27.

¹⁸ Clancey, xx.

¹⁹ Jacquelyn K. Davis, "The Submarine's Role in the Twenty-First Century," Sea Power, July 1997, 35.

military operations.²⁰ Sometimes CINC's wonder how submarines can contribute a deterrent effect if they remain unseen. Submarine water space management requirements, similar to tactical air traffic control restraints between two or more aircraft, can occasionally impede a CINC's plans. When the fighting starts, a submarine's only capability of directly influencing events ashore is by firing its very limited numbers of cruise missiles. However, many scenarios can be postulated when a CINC may think cruise missiles are non-nuclear strategic assets that are inappropriate for tactical or operational level purposes. As a result, sometimes SSNs will not be called upon to deliver an offensive punch ashore unless the CINC wants to send a surprise, non-nuclear strategic message.

Vice Admiral Roger F. Bacon, USN (Retired) has stated that "in regional conflicts, the Navy must emphasize the ability to project power ashore with minimum risk to our forces. Those who must plan for future regional conflicts should recognize the historical role of the submarine as a force multiplier."²¹ In the past, many CINC's rightfully pictured a submarine's sole purpose as providing national, theater, and operational commanders vital reconnaissance information for formulating contingency plans.²² Today, as assets allocated to theaters are diminishing, CINC's and CJTF's should contemplate the additional attributes a SSN can contribute to joint forces involved in their area of responsibility (AOR) conflicts.

A SSN can rapidly respond to worldwide crises, operating on behalf of national, theater, or joint task force (JTF) commanders, often being the first combatant to arrive in the AO. Submarine induced misgivings may be enough to deter a country from implementing its strategy, while simultaneously providing a non-provocative presence if the political implication of a visible presence is untenable.²³ Recall that both Argentina and Libya altered their national strategies because SSNs were possibly lurking near their shores. Today, in an age of missiles, stealth aircraft, and covert submarines, presence does not always translate into visible forces. The days when presence meant "a stately procession of warships in full view of those that were intended to receive-the-message"²⁴ are long gone.

Unannounced submarine movements in international waters are not considered an ostentatious act that a potential adversary may interpret as overly provocative. As evidence of what a "too much, too soon" presence can

²⁰ Arthur K. Cebrowski, "Network-Centric Warfare—Its Origin and Future," US Naval Institute Proceedings, January 1998, 33.

²¹ Roger F. Bacon, "Submarine Warfare: It's A-Changing," US Naval Institute Proceedings, June 1992, 52.

²² Peppe, 58.

²³ "United States Submarines," (Unpublished Research Paper, Chief of Naval Operations (N87), Washington, DC: 1996), 1.

²⁴ Jan S. Breemer, "Deterrence, Naval Presence, and the Submarine Fleet," The Submarine Review, October 1992, 30.

induce, recall that in 1971 the movement of a carrier battle group (CVBG) into position near India to influence events ashore was not well received by that government. In 1989, some elements of the Philippine government reacted similarly when a CVBG was positioned nearby in response to a failed coup attempt aimed at ousting their new President.²⁵ It is essential for commanders to recognize that national leaders frequently "will resist demands for policy modifications most strenuously when such demands are made publicly, which is usually unavoidable when [visible] military power is used."²⁶

Commanders must deploy forces, perceived as invulnerable to a preemptive attack, that do not trigger an inadvertent escalation in the crisis while simultaneously being credible enough to deter. Submarines can contribute to this gunboat diplomacy strategy. By its presence, a surface ship can be destabilizing simply because it is more vulnerable to attack than a SSN.²⁷ Easy targets do not usually deter. As the U.S.S. *Vincennes* incident demonstrated, surface ship operations may not be the presence-of-choice, "depending on the opponent, his record of accommodation to the threat of force, and his military capabilities."²⁸ This axiom is applicable in third world conflicts when an enemy's single lucky shot can have strategic and operational implications.

Often it is difficult for the CINC to decide when to employ joint forces in response to a third world crisis. However, when the decision is made to use the military, the allocated forces must deploy quickly, often be self sufficient while operating at remote distances from home base support, and be capable of secure communications and superior reconnaissance/intelligence capabilities.²⁹ From a CINC's perspective, a SSN, operating independently or as part of joint forces, fulfills these prerequisites.

To assist operational commanders when decisions are made to allocate submarine forces, a John Hopkins University study concluded that a SSN should be employed if a third world adversary has any of the following:³⁰

- * A moderate-to-large naval force including mini subs or submarines and capital ships it highly values.

²⁵ Assistant Chief of Naval Operations, Undersea Warfare, Submarine Roles in the 1990's and Beyond (Washington: 18 January 1992), 5.

²⁶ Breemer, 31.

²⁷ Ibid, 32.

²⁸ Ibid.

²⁹ Gregory R. Copley, "New Strategic Environments Demand a New Doctrinal View," Defense and Foreign Affairs Strategic Policy, November-December 1997, 9.

³⁰ John R. Benedict, Jr., "Missions and Roles for U.S. Submarines in Third World Operations," The Submarine Review, 1991, 63.

- * Integrated air defense and anti-ship capability able to place U.S. aircraft and surface combatants at significant risk.
- * Militarily valuable fixed land targets within submarine launched cruise missile range of water navigable to SSNs.³¹
- * Vulnerable coastlines that warrant clandestine operations off their coasts by submarines for operations related to surveillance, special warfare, etc.

These factors are not a prescriptive device or an absolute determinant; operational commanders ought to consider them when contemplating employing SSNs in third world conflicts.

Preparing and Shaping the Battlespace for a Third World Conflict

“The enemy must not know where I intend to give battle. For if he does not know where I intend to give battle, he must prepare in a great many places....and when he prepares everywhere he will be weak everywhere.”

Sun Tzu, The Art of War³²

Get In and Get Out

During the Cold War SSNs typically conducted tasks, directed by the national level, that were considered vital to the security of the United States. Since then, some SSNs have continued to do this while others are routinely deployed as part of theater carrier battle groups. A third element is deployed as independent assets under the direct OPCON of the theater commander. As a result of these changes, CINCs, CJTFs, and even fleet and battle group commanders have the ability to easily assign tasking to SSNs under their OPCON or tactical control (TACON). Unfortunately, too frequently commanders are hesitant to give SSNs direct tasking³³ or, when they do, their decisions are made so late that a submarine's capabilities cannot be properly utilized in a timely manner to help influence the full spectrum of events. Time is the most crucial operational factor for the CINC to anticipate when contemplating submarine tasking.

Upon deciding to employ a submarine, an operational commander should apply the principle of “first in, first out” to properly sequence and position the SSN into his operational design.³⁴ This simply means to get a SSN on station early, wherever its most beneficial, have it do the assigned task, and then get it out of the area or on the

³¹ This places about 75% of the earth's land mass within a submarine's range.

³² Sun Tzu, The Art of War (London: Oxford University Press, 1963), 98.

³³ Typical reasons are the prevention of submarine mutual interference is too difficult, the submarine's communications suite is inadequate, the mission's security restrictions are so stringent that the commander feels he has lost control of his own asset, or an unfamiliarity of the submarine's capabilities.

³⁴ Kevin Peppe, “SSNs: Supporting the Battle Group?,” US Naval Institute Proceedings, May 1997, 41.

periphery prior to the arrival of other forces.³⁵ This model works best for an operational commander planning on using SSNs in advanced battlespace preparations that require intelligence gathering, mine or strike warfare tasks, special operations, or antisubmarine warfare tasks. To make this scheme work, CINCs must think weeks ahead and anticipate contingencies that require a SSN's early presence on station.

Submarine Operational Intelligence: It's Not Seen But Heard

A submarine's special attributes—stealth, endurance, maneuverability—make it a potent intelligence collection platform. Its presence in the littorals, perhaps very close to an enemy's coast, can support national or theater objectives. A SSN's tasking can range from collecting operational intelligence for possible future operations or major campaigns to acting as a tactical I&W platform, similar to *Spartan* and *Splendid* during the Falklands Islands War. In all circumstances, a SSN should be assigned battlespace preparation tasks well in advance of other forces to help the CINC identify early the enemy's critical factors (center of gravity, critical strengths and weaknesses, vulnerabilities), tactics, doctrine, and possible intentions. A SSN's almost unlimited dwell time in the AO permits it to collect all source intelligence (ACINT, VISINT, SIGINT, COMINT) twenty-four hours a day, seven days a week, for months at a time. This type of intelligence contributes to the joint force's operational protection by reducing its vulnerability to an enemy's hostile acts, influence, and surprise while helping to preserve the CINC's freedom of action and massing of combat power.³⁶

During NATO's Operation Sharpguard, submarines off the former Yugoslavia's (FRY) coast informed Allied and American CJTFs of embargo compliance violators so multinational forces could interdict them. This tactical level intelligence had operational and strategic implications by contributing to the FRY's economic demise and inability to replenish weaponry. In addition, these boats served as gate guards that forewarned the Standing Naval Forces Mediterranean (NATO) CJTF when FRY ships proceeded to sea. Simultaneously, the submarines assisted in advanced battlespace preparations by collecting tactical and operational intelligence needed for a future NATO presence in country. In an era of shrinking submarine assets, CINCs must determine what specific burdens pertaining to potential third world conflicts our allies ought to be asked to assume or share with deployed U.S.

³⁵ Ibid., 42.

³⁶ Joint Chiefs of Staff, Doctrine for Joint Operations (Joint Pub 3-0) (Washington, D.C.: 1993), A-2.

forces. From my personal observations, there are many similar submarine intelligence tasks that Allied submarines could routinely perform.

From an operational or strategic perspective, a SSN can assist commanders weeks ahead of a possible noncombatant evacuation operation (NEO) by gathering early intelligence that may be vital to planning the operation. Unaware that a submarine is loitering nearby, an adversary will not alter its routine as may happen for a periodic satellite or aircraft reconnaissance pass. As a result, operational intelligence obtained by a SSN is less vulnerable to an enemy's operational deception and takes advantage of lapses in the enemy's operational security. This valuable, time sensitive intelligence input may facilitate a CINC's crisis action planning process.

Operational commanders need to recognize that submarine reconnaissance tasks can be extremely sensitive operations with national strategic implications if the SSN is counter-detected. However, since successful implementation of future United States' strategy often requires a determination of the appropriate national deterrent for each recognized threat, covert intelligence collection plays a "vital role in determining exploitable [enemy] vulnerabilities and [in providing] timely intelligence indications and threat warnings to policy makers before an incident occurs."³⁷ When ordering and after commencing a SSN operational intelligence task, CINCs must frequently and very carefully evaluate the considerable risks versus possible intelligence gains, especially in those AOs where significant repercussions are anticipated if the SSN is detected. The risks can be mitigated by the CINC's staff coordinating theater intelligence assets into a dedicated C4I network that alerts the SSN of unusual indicators indicative of an adversary getting a sniff of the submarine's presence in the littoral. In all circumstances, the commander must be thinking ahead to order the submarine off station if conditions change and the risks are no longer commensurate with the possible intelligence gains.

The Diesel Submarine Threat—It Can Control the CINC's Operational Tempo

Today 20 third world countries have a total of about 200 diesel submarines.³⁸ Diesel submarines are purchased by these countries as proof of armed power and prestige, for coastal defense and sea denial, and for their ability to retaliate.³⁹ To make matters worse, the threat posed by diesel submarines may be on the "verge of

³⁷ Robert Kupperman and Frank Cilluffo, "Between War and Peace: Deterrence and Leverage," The Brown Journal of World Affairs, Winter/Spring 1997, 40.

³⁸ Michael D. Wallace and Charles A. Meconis, "Submarine Proliferation and Regional Conflict," Journal of Peace Research, 1995, 80.

³⁹ J. P. Coquiot, "Submarines on Loose Leash. Countermeasures?," Armada International, February 1997, 40.

increasing dramatically, especially when accompanied by the development of weapons of mass destruction (WMD)."⁴⁰ A 1995 Department of Defense study ascertained that our next century's adversary will probably have WMD resources, mines, and diesel submarines.⁴¹ The mere possibility of a diesel submarine presence in an AO may be enough to curtail a joint amphibious operation or passage of surface combatants and commercial logistics ships through narrow, constrained bodies of water such as the Strait of Gibraltar or the Strait of Hormuz. Unquestionably, diesel submarines can easily invoke an "anti-access" strategy that precludes surface ship operations in an AO.

Operational commanders make decisions, often months or years in advance, that can help mitigate or solve the diesel submarine problem. Once again, the operational time factor is of critical importance. CINCs control the three elements of solving the diesel problem—advanced battlespace preparations, asset (aircraft, surface ships, and submarines) allocation, and accurate intelligence cueing—by the proper synchronization and allocation of forces and technologies employed in finding a solution. Advanced battlespace preparation includes determining the potential adversary's operating patterns/areas, acoustic signature, tactics, and crew proficiency before the conflict begins. This is best accomplished by permitting SSNs to operate in the close vicinity of the adversary's diesel boats and naval bases to facilitate covert collection of operational and tactical intelligence on all aspects of the enemy's submarine fleet. The operational commander must recognize that without advanced battlespace preparation, extensive asset allocation (a large numbers of ships, submarines, and aircraft performing coordinated antisubmarine warfare operations) and extremely accurate cueing (real time operational and tactical intelligence) will be required prior to any contingency if a diesel submarine is considered a anti-access threat to the joint forces. Foremost, the CINC must understand that finding diesel submarines is extremely time consuming even with advanced battlespace preparations.

A CINC's operational tempo and plans are affected if an enemy's diesel submarines cannot be quickly located. Because the operational risk to the forces is increased while the enemy's diesel submarines are unlocated, a CINC may decide the operation cannot proceed as scheduled. Concurrently, the joint force synergy is decreased because maritime and intelligence assets are splintered while allocated to the anti diesel task. When the enemy submarines are located, the JTF can enter an AO with minimal risk because the forces know where the threat is

⁴⁰ Wallace and Meconis, 80.

⁴¹ Henry H. Shelton, "Special Operations Forces: Looking Ahead," Special Warfare, Spring 1997, 4.

(and sometimes where it is not) and how to avoid it. In some circumstances, an operational commander should contemplate if a deliberate public announcement of a SSN's presence near an adversary's coast would deter an enemy's diesel submarine operations. This strategy gives the CINC additional flexibility since a SSN can easily transition to a "gate guard" role or provide a "diesel submarine free zone" if its declared presence does not prevent an adversary's diesel submarines from conducting at sea operations.

Antisubmarine warfare is a complex skill that can quickly atrophy unless frequently practiced in complicated exercise scenarios. From my observations, too often, operational proficiency at the tactical level is being sacrificed to train our allies as part of the CINC's forward engagement plan. Forward engagement exercises are vitally important but often are just too simple to benefit our SSN crew's preparations for fighting a capable third world adversary.

The Amphibious Submarine: A Silver Bullet

A SSN with embarked special operations forces (SOF) provides an operational commander a covert platform that is capable of performing multiple tasks with elements of surprise, accuracy, and secrecy. This platform is an excellent method of waging operational fires that may have strategic implications. The submarine/SOF team is trained for a multitude of tasks including target designation in support of air strikes, forward air control, surveillance and covert intelligence collection, and limited direct action in unsupported and potentially hostile territory.

For example, with advanced planning operational commanders can order a submarine with embarked SEALs to conduct beach feasibility studies or landing zone surveys well before elements of an amphibious task force arrive in area. Simultaneously, in anticipation of a NEO, the same SSN can be on station, well ahead of other joint forces, collecting vital operational intelligence in close proximity of an adversary that gives theater and national commanders vital data needed for effective planning. If necessary, the submarine/SOF team is capable of attacking critical enemy targets with minimal risk to U.S. forces. Special forces using a SSN's swimmer delivery vehicle can destroy or attach a noise device to an enemy's diesel submarine at the pier, or attack a coastal missile defense battery prior to scheduled air strikes. In third world conflicts, a submarine/SOF "combination provides operational commanders an unparalleled capability to counter both traditional and asymmetric threats."⁴² In these

⁴² Davis, 37.

conflicts, submarine SOF insertion will be called upon more frequently as operational commanders seek to improve their ability to handle limited threats with minimal forces and risks.⁴³ Submarine capabilities and SOF provide a CINC decisive force with limited commitment.

Operational commanders must be aware of the limitations associated with submarine SOF tasking. Any submarine SOF operation, whether it is a planned operational fire or deception, an early battlespace preparation task, or the main attack, is a “silver bullet” mission. Commanders, considering the strategic and operational implications, expect 100% success at the tactical level. But to maximize the chances of tactical success commanders must think of the operational factors they control—time, space, and force. Once again, time is the dominant factor.

Forethought is required to give the submarine adequate transit time to get on station. If the special forces are not onboard when the submarine deploys, time must be allocated for an at sea rendezvous with a subsequent equipment check and, if necessary, additional planning. Upon arrival in the AO, the submarine should be given an opportunity, once again more time, to determine the physical characteristics (currents/weather, ocean bottom topography, sea lanes, unexpected enemy military sites/operations etc.) of the area. While the time and space factors are brought under control, primarily by the submarine, the operational commander should be analyzing what additional supporting force requirements are needed to ensure 100% success—the operational protection factor. These CINC supplied forces may be additional intelligence monitoring that is required, communications channels or tactical air cover that should be allocated for possible contingencies, or the formation of a Joint Special Operations Task Force (JSOTF). When used, the JSOTF should have TACON of the submarine/SOF team to ensure unity of command and unity of effort amongst all the forces.

Based on my observations, many operational commanders view special warfare with little confidence and do not clearly understand when to use it. The problem is exacerbated by the secrecy requirements and compartmentalization invoked when planning SOF missions. Unfortunately, many commanders and their staffs lack SOF expertise. These conditions cause staffs to think someone else is planning the ‘silver bullet’ mission, resulting in no cohesive plan on when or how to use SOF. Similar to the antisubmarine warfare training

⁴³ Glenn W. Goodman, Jr., “Seals and Submarines: The Littoral Alliance,” Sea Power, July 1996, 29.

deficiencies noted earlier in CINC's forward engagement exercise programs, deployed SOF training is often conducted at the level of lowest common denominator due to a lack of proficiency amongst some allied forces.

When Surprise Matters

As the early 1998 Persian Gulf crisis with Iraq illustrated, overseas basing rights for U.S. forces cannot be guaranteed in spite of prior agreements, particularly in areas of possible third world conflicts where indigenous interests frequently take precedence and are always changing. In these situations, a SSN's inherent stealthy characteristics, including naval special warfare assets, combined with cruise missiles and sea mining capabilities—and, in the future, Navy Tactical Missile System (NTACMS) missiles and submarine launched unmanned air and underwater vehicles—make it a valuable offensive tool for operational planners. When surprise and covert action matter (unlike past employment of submarine launched cruise missiles), SSNs operating unilaterally or with joint forces, possess an unparalleled ability to strike land based strategic and tactical targets.⁴⁴ Submarine precision strike gives CINC's a "key enabling capability in future conflicts"⁴⁵, especially when the number of personnel placed at risk remains an important consideration.⁴⁶ Submarine covert mining can also be used by commanders when it is necessary to deny waters to an adversary, thereby, decreasing his space.

With the advent of NTACMS, SSNs will be better able to strike terrorists and WMD targets. This new technology, combined with SOF assets and joint intelligence capabilities, will permit CINC's to quickly hit designated terrorists, at the time and place of our choosing—with operational surprise. This strategy will become important during future military operations other than war when the United States is engaged in countering what the President's national military strategy calls "growing dangers to our security." Presently, the military options in combating terrorism are too few, too slow, and too complicated.

⁴⁴ Davis, 36.

⁴⁵ Ibid., 37.

⁴⁶ Ibid., 37.

Conclusion

"The only thing more difficult than implanting new ideas into the military mind was the task of removing them."
Captain Sir Basil Liddell-Hart after World War I

Preparing for the Future

The proper utilization of submarines lies in operational art. As mission requirements and technology continue to change, concurrent with submarine force levels that are diminishing, the proper utilization of SSNs will become more difficult. The problem is further complicated by the Navy's failure to develop and publish doctrine concerning the operational aspects of submarine warfare. Likewise, joint doctrine fails to clearly incorporate the maritime element into its strategy. The Navy's most recent example of submarine employment—the Cold War—resulted in many naval operational commanders being hesitant to request submarines when forces are allocated for pending operations. This hesitation has been translated to non-Navy theater commanders whose staffs typically lack in-depth SSN operational expertise.

Recommendations

When appropriate, submarines should be part of a CINC's operation and concept plans. Moreover, these plans must boldly and unequivocally delineate that a submarine is usually needed prior to invoking the bulk of the plan. Without proper advanced synchronization being incorporated into a plan, it is extremely difficult to quickly and decisively employ a SSN.⁴⁷ In addition, the planning process should consider if a SSN is a logical platform to conduct strategic and operational fires aimed at influencing or affecting an adversary's will to fight.

Submarines are most beneficial when the maxim "first in, first out" is the gospel truth. Too often, operational commanders request submarines when the operation has commenced. At that point, the benefits of advanced battlespace preparations, uniquely gained from an early SSN presence off an adversary's coast, are lost. In third world conflicts, the timeliness of any SSN employment decision categorically determines the submarine's ultimate effectiveness.

If the CINC requires a SSN to operate near a country's coast, early coordination with the NCA is needed. The CINC must be prepared to justify to the NCA the possible risks versus gains of his proposal. Commanders should not anticipate automatic approval to operate near a country's coast; planning needs to consider alternative

⁴⁷ Milan Vego, On Operational Art (Newport, RI: Naval War College Press 1998), 234.

courses of action. Later in the planning process, prior to the majority of the JTF's arrival in the crisis area, a decision must be made whether the SSN remains on station, moves to the AO's fringe, or is ordered elsewhere.

Barriers must be broken, starting at the CINC's level, to ensure theaters are prepared to employ SSN delivered SOF in tomorrow's third world conflicts. In addition, consideration should be given to specific submarine/SOF tasks to combat terrorist and WMD threats. Establishing a Naval Special Warfare Commander position as part of the naval Composite Warfare Commander concept on battle group staffs would help lessen SOF anxiety from the Navy's perspective while providing in-house expertise for coordinating the actions of a battle group sponsored JSOTF. Another likely benefit is better communications and unity of effort between the CINC's theater SOF commander and all naval special warfare forces at sea.

As discussed earlier, anti diesel submarine and SOF tasks are asset intensive and extremely complex. To be ready for third world conflicts, our forces need to periodically train unilaterally, especially when forward deployed near a potential AO that may require their war fighting skills. Special warfare units from all U.S. services need to practice likely third world contingency plans on board SSNs using U.S. eyes only "mirror image offset" training scenarios.⁴⁸ Unilateral training lets forces practice war using off-the-shelf plans and all facets of the theater's Command and Control structure. Most importantly, realistic, in-theater training will ensure a CINC does not advocate or attempt a "mission impossible" caused by his own ignorance.

In many circumstances, bilateral operational intelligence agreements can be negotiated with allies to help alleviate or lessen the possible intelligence lapses caused by a reduced SSN presence in theater. Similarly, allied diesel submarines, ships, and maritime patrol aircraft can assist CINCs in advanced battlespace preparation by conducting deliberate, focused anti diesel submarine surveillance tasks near potential adversary's ports and operating areas.

When planning for potential third world conflicts, the CINC must decide how to manage SSN OPCODE. If the CINC relinquishes OPCODE to a JTF commander, then all subsequent submarine movements within the AO must be coordinated with the JTF staff. This procedure prevents mutual interference between submarines if the CINC decides to position another SSN, normally for operational intelligence purposes, in the vicinity of the first SSN. However, coordination of submarine movements between staffs is now more difficult and time consuming. But, if

⁴⁸ A mirror image offset scenario simulates a possible real world mission in every respect.

the AO has an expected diesel submarine threat or local special warfare operations are planned, it is advantageous to give the on-scene JTF commander OPCON of the submarine. Under some circumstances, the CINC may want to retain maximum flexibility for himself and the JTF commander. This is best achieved by giving the JTF TACON of the submarine while the CINC retains OPCON and the responsibility to prevent mutual interference between all SSNs within the AO. Battle group and fleet commanders, likely maritime CJTFs, are now comfortable with either arrangement.

Many possible third world conflicts may employ amphibious forces only, perhaps without a theater CVBG presence. Consequently, elements of the amphibious ready group (ARG) must be trained to ensure they are capable of employing submarines under their TACON. Unfortunately, most ARGs are reluctant to have SSNs "underfoot" in the Amphibious Objective Area and generally refuse submarine services because SSNs are not part of current amphibious warfare doctrine. Contributing to the problem is a lack of training and exercise opportunities between submarine and ARG forces. The bottom line is that CJTFs involved in an ARG only operation (or any other CJTF for that matter) should be hollering early for submarine support and if they cannot competently employ a SSN, they must yell for assistance.

History shows that "the advantage belongs to the stealthy."⁴⁹ This coupled with a understanding that third world conflicts demand maximum flexibility, a quick response with little advanced preparation, and "a come as you are" mentality makes SSNs ably suited for such wars. But CINC's must recognize that submarines are not a panacea and inject many operational limitations into a commander's decision making matrix. The time factor must be a primary consideration in every decision made regarding SSN employment.

Submarines may be our best national asset to operate in harm's way especially if a CINC's mission must be achieved "with damage and casualties commensurate with the importance of the operational objectives."⁵⁰ In the current environment that means a quick in and out strategy based on a low tolerance for casualties. With advanced preparation and doctrine, submarines can be one of the choices for CINC's to consider. Today's enemy—instability—will not wait for the unprepared.

⁴⁹ Robert Haffa and James H. Patton, Jr., "Analogies of Stealth: Submarines and Aircraft," *Comparative Strategy*, 1991, 263.

⁵⁰ John R. Benedict, Jr., "Operational and Technology Implications in Joint Littoral Warfare," *The Submarine Review*, January 1994, 62.

Bibliography

Assistant Chief of Naval Operations for Undersea Warfare, Department of the Navy. Submarine Roles in the 1990's and Beyond. Washington, D.C.: 18 January 1992.

Bacon, Roger F. "Submarine Warfare: It's A-Changing." U.S. Naval Institute Proceedings, June 1992, 52-54.

Benedict, John R. "Missions and Roles for U.S. Submarines in Third World Operations." The Submarine Review, October 1991, 63-71.

_____. "Operational and Technology Implications in Joint Littoral Warfare." The Submarine Review, January 1994, 61-71.

Breemer, Jan S. "Deterrence, Naval Presence, and the Submarine Fleet." The Submarine Review, October 1992, 28-36.

Brown, C. R. "The Principles of War." U.S. Naval Institute Proceedings, June 1949, 621-633.

Byron, John L. "A New Target for the Submarine Force." U.S. Naval Institute Proceedings, January 1990, 37-39.

Cebrowski, Arthur K. "Network-Centric Warfare—Its Origin and Future." U.S. Naval Institute Proceedings, January 1998, 28-35.

Chief of Naval Operations. "Forward...From the Sea: The Navy Operational Concept." Washington, D.C.: March 1997.

Chapman, Richard. "Submarines in a New Security Environment." The Submarine Review, October 1993, 57-69.

Clancey, Tom. Submarine: A Guided Tour Inside a Nuclear Warship. New York: Berkley Books, 1993.

Copley, Gregory R. "New Strategic Environments Demand a New Doctrinal View." Defence Doctrines, November-December 1997, 7-11.

Coquinot, J. P. "Submarines on Loose Leash. Countermeasures?" Armada International, February 1997, 40-47.

Courter, Jim. "The Boomer Reborn." U.S. Naval Institute Proceedings, November 1997, 51-53.

Cox, Ken and Tom Maloney, "Attack Submarines in the Post-Cold War Era." The Submarine Review, January 1994, 27-36.

Dalton, John H. "A Submarine Force...From the Sea." The Submarine Review, July 1994, 7-12.

Davis, Jacquelyn K. "The Submarine's Role in the Twenty-First Century." Sea Power, July 1997, 35-37.

Douglass, John. "Often the Only Option." U.S. Naval Institute Proceedings, February 1998, 32-35.

Ellington, Sidney T. "Special Operations in Littoral Warfare." Unpublished Research Paper, Naval Postgraduate School, Monterey, CA: 1995

Giaquinto, Joseph N., Lawrence McDonald, and J. Patrick Madden. "The Quick Strike Submarine." U.S. Naval Institute Proceedings, June 1995, 41-44.

Goodman, Glenn W. "Getting SEALs Ashore." Armed Forces International, January 1997, 22-23.

_____. "Seals and Submarines: The Littoral Alliance." Sea Power, July 1996, 29-31.

_____. "Unlocking the Door to the Littoral Battlespace." Sea Power, March 1996, 15-18.

Gray, Colin S. "Deterrence and Regional Conflict: Hopes, Fallacies, and Fixes." Comparative Strategy, January-March 1998, 45-59.

Haffa, Robert P. and James Patton. "Analogues of Stealth: Submarines and Aircraft." Comparative Strategy, Vol. 10, 1991, 257-271.

_____. "The Survivability Business: A National Defense Growth Industry." The Strategic Review, Winter 1997, 7-14.

Hamblet, Bill. "Revitalizing Naval Special Warfare." U.S. Naval Institute Proceedings, June 1997, 43-47.

Hanley, John T. "Implications of the Changing Nature of Conflict for the Submarine Force." Naval War College Review, Autumn 1993, 9-27.

Hastings, Max and Simon Jenkin. The Battle for the Falklands. London: W. W. Norton & Co., 1983.

Hay, James C. "SSNs and Low Intensity Conflict." The Submarine Review, July 1990, 36-42.

Hervey, John. Submarines. London: Brassey's Ltd., 1994.

Hessman, James and Vincent Thomas. Interview with VADM Roger F. Bacon, Assistant Chief of Naval Operations for Undersea Warfare, Sea Power, July 1991, 9-18.

Holland, W. J. "ASW Is Job One." U.S. Naval Institute Proceedings, August 1992, 30-34.

Joint Chiefs of Staff. "Joint Vision 2010—America's Military: Preparing for Tomorrow." Washington, D.C.: 1996

Joint Pub 2-0. Joint Doctrine for Intelligence Support to Operations. The Joint Chiefs of Staff, Washington, D.C.: 5 May 1995.

Joint Pub 3-0. Doctrine for Joint Operations. The Joint Chiefs of Staff, Washington, D.C. 1 February 1995.

Jones, D. A. "Submarine Force Plans and Programs: Preparing for the Challenges of the 21st Century." The Submarine Review, October 1995, 26-33.

Kupperman, Robert and Frank Cilluffo. "Between War and Peace: Deterrence and Leverage." The Brown Journal of World Affairs, Winter/Spring 1997, 30-51.

Lodnell, Joseph. "It Only Takes One." U.S. Naval Institute Proceedings, December 1996, 30-33.

Middlebrook, Martin. Task Force: The Falklands War, 1982. New York: Viking Penguin, Inc., 1987.

Miller, James E. "Submarine-Launched Unmanned Aerial Vehicles (UAVs): A Rational for Operational Utilization with Concepts for Shipboard Integration." The Submarine Review, June 1995, 63-71.

Murdock, Paul. "SSNs Aren't Enough." U.S. Naval Institute Proceedings, February 1996, 48-51.

Newman, Richard J. "Breaking the Surface." U.S. News & World Report, 6 April 1998, 28-42.

Osterhaus, Sean. "The Use of Submarines in Small-Scale Conflicts." The Submarine Review, January 1991, 56-59.

Owens, William A. "Antisubmarine Warfare: Still a Priority." U.S. Naval Institute Proceedings, March 1993, 124-129.

_____. "Naval Voyage to an Uncharted World." U.S. Naval Institute Proceedings, December 1994, 30-34.

Patton, James H. "Submarines vs. Mines." The Submarine Review, April 1995, 23-26.

Patton, Jim. "The U.S. SSN in Third World Conflicts." The Submarine Review, January 1991, 73-78.

Peppe, Kevin. "SSNs: Supporting the Battle Group?" U.S. Naval Institute Proceedings, May 1997, 40-43.

_____. "Rethinking Tomorrow's Attack Submarine Force." The Submarine Review, June 1995, 53-62.

Pritchett, William C. "SSNs Have Role in Low Intensity Conflicts." U.S. Naval Institute Proceedings, July 1996, 71-72.

"Requirements for Submarine EW to Grow." Journal of Electronic Defense, April 1996, 24-26.

Roscoe, Theodore. United States Submarine Operations in World War II. Annapolis, MD: Naval Institute Press, 1949.

Rosenleff, Eric. "Contingency Blues." U.S. Naval Institute Proceedings, January 1995, 53-57.

Secretary of the Navy. "Forward...From the Sea." Washington, D.C.: 1995.

Shannon, Jim. "Undersea Warfare is Team Warfare." U.S. Naval Institute Proceedings, June 1996, 48-49.

Shelton, Henry H. "Special Operations Forces: Looking Ahead." Special Warfare, Spring 1997, 2-11.

Shwei, Hei. "Dragons and Centipedes at Sea." U.S. Naval Institute Proceedings, November 1995, 65-69.

Starr, Barbara. "Chemical and Biological Terrorism." Janes Defence Weekly, 14 August 1996, 16-21.

_____. "US Special Ops Forces Head for Mainstream." Janes Defence Weekly, 12 March 1997, 57-60.

"Submarines and the Projection of Sea Power." The Submarine Review, January 1989, 2-10.

Sun Tzu. The Art of War. London: Oxford University Press, 1963.

Thomas, Brian. "The Future Course of US Submarines." The Submarine Review, July 1993, 58-69.

Tritten, James J. "The Submarine's Role in Future Naval Warfare." Research Paper from the Naval Postgraduate School, Monterey, California: 12 May 1992.

U.S. Naval Doctrine Command. Naval Doctrine Publication 1-Naval Warfare. Norfolk, VA: 1994.

U.S. Naval Doctrine Command. Naval Doctrine Publication 2-Naval Intelligence. Norfolk, VA: 1994.

U.S. Naval Doctrine Command. Naval Doctrine Publication 3-Naval Operations. Norfolk, VA: 1994.

U.S. Naval Doctrine Command. Naval Doctrine Publication 6-Naval Command and Control. Norfolk, VA: 1994.

U.S. Special Operations Command. United States Special Operations Forces Posture Statement. Tampa, FL: 1996.

Vego, Milan. On Operational Art. Newport, RI: Naval War College Press, 1998.

Wallace, Michael D. and Charles A. Meconis. "Submarine Proliferation and Regional Conflict." Journal of Peace Research, February 1995, 79-95.

Walsh, Edward J. "Unique Tech Refresh Planned For NSSN." Sea Power, July 1996, 17-21.

Weistroffer, Joseph K. "Trident Submarine as a Special Warfare Platform: A Medical and Operational Overview." The Submarine Review, January 1996, 24-32.

Wilson, George C. "Sealing a New Mission/Mini Subs Hitch a Ride to Secret Destinations." Navy Times, 1 April 1996.

Wright, James E. "Submarine Design for the Littorals." U.S. Naval Institute Proceedings, December 1995, 39-41.

Ya'ari, Yedidia. "The Littoral Arena: A Word of Caution." Naval War College Review, Spring 1995, 7-20.